



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : A61C 19/02	A1	(11) International Publication Number: WO 00/57810 (43) International Publication Date: 5 October 2000 (05.10.00)
(21) International Application Number: PCT/SE00/00352 (22) International Filing Date: 23 February 2000 (23.02.00) (30) Priority Data: 9900873-2 9 March 1999 (09.03.99) SE (71) Applicant (for all designated States except US): NOBEL BIO-CARE AB (publ) [SE/SE]; Box 5190, S-402 26 Göteborg (SE). (72) Inventors; and (75) Inventors/Applicants (for US only): KVARNSTRÖM, Bjarne [SE/US]; 214 17th Street, Huntington Beach, CA 92648 (US). SULLIVAN, Richard [US/US]; 347 West 59th Street, Clarendon Hills, IL 60514-1764 (US). VIGHAGEN, Torbjörn [SE/SE]; Kalkstensvägen 9, S-437 32 Lindome (SE). (74) Agent: OLSSON, Gunnar; Nobel Biocare AB (publ), Box 5190, S-402 26 Göteborg (SE).		(81) Designated States: AU, CA, JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>
(54) Title: METHOD, ARRANGEMENT AND USE FOR PROVIDING AND ORGANIZING INSTRUMENTS AND COMPONENTS FOR BONE IMPLANTATION (57) Abstract <p>In connection with implantations in bone, for example dentine, instruments and components are used which are chosen from an extensive range. The instruments and components which are necessary or can be used for the given implantation are applied on a number of first units (1) which function as modules and which are arranged in a second unit (2) which, after the application of the first units, is joined together with a third unit (3) for enclosure of the first units (1), with a simultaneous position-determining function for the first units and the instruments and components arranged on these. The instruments and components thus chosen are made available to a user who, in a subsequent organizational phase, can change the number of modules and module types and apply further accessories according to requirements.</p> <div data-bbox="828 1155 1453 1543" data-label="Image"> </div>		

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TITLE

Method, arrangement and use for providing and
organizing instruments and components for bone
5 implantation

TECHNICAL FIELD

The present invention relates, inter alia, to a
10 method for use in connection with implantation in bone,
for example in jawbone, permitting one or more choices
of instruments and components for one or more
implantations from an extensive range of prosthetic
instruments and sets of components, for example
15 fixtures, thread taps, screws, etc. The method also
permits individualized organization (layout) of the
respective chosen instruments and components for one or
more persons performing the respective implantation.
The invention also relates to an arrangement for
20 providing instruments and components of the type
mentioned above for implantation work in bone, for
example jawbone, and making it possible to
individualize this provision for the person or persons
carrying out the work. The invention also relates to a
25 modular arrangement for providing prosthetic
instruments and sets of components, for implantation in
bone, in an individually organizable manner. Finally,
the invention also relates to a use of modular
arrangements with first and second modules in
30 implantation work in bone, preferably in jawbone.

PRIOR ART

It is already known to arrange and to use
35 different base trays for instruments and components
which are to be used in various types of implantation
work. For example, there are trays for fitting fixtures
and applying spacers both in separate and combined
configurations. There are trays which are intended for

different countries and fields of use. Such trays are available, inter alia, in the so-called Brånemark System®, which includes a small number of variations of trays. The trays are essentially limited in terms of their configurations and contents. The instruments and the components are assigned fixed positions upon manufacture or production.

The instruments and components in question are available in a very wide range covering different types and sizes. In addition, there are different treatment methods and implant situations, and this contributes to increasing the range of instruments and components. A manufacturer working in the dental field is expected to provide the entire range, and this must be made available to the user (dental technician, dentist, surgeon) in a very specialized way. In addition, the instruments and the components have small dimensions and, seen as a whole, good organization is needed to be able to provide and organize this provision in a technically simple manner.

In this connection, it is also already known to provide the specified range, to be made available to the user, with a coding function such that instruments and components for different situations or platforms are assigned different markings, for example colours.

DESCRIPTION OF THE INVENTION

TECHNICAL PROBLEM

In accordance with the above, there is therefore a commercial requirement to be able to permit specified choices from an extensive range of instruments and components which can be easily used by the user in question. The invention aims to solve this problem, among others.

The trays used at present for instruments and components for various types of implantation work are not very manageable. Among other things, they are too inflexible, and this is simply unacceptable for

handling the increasingly varying range of instruments and components.

In addition, the arrangements used at present are considered unsuitable, large and cumbersome. The known arrangements and methods cannot be adapted in an acceptable manner to the different platforms (NP = narrow platform, WP = wide platform, and RP = regular platform). In addition, the associated systems and methods are considered complicated, difficult to work and old-fashioned. The invention aims to solve this set of problems too.

A manufacturer of this type of range is required to provide the product range in a technically efficient manner and to get it to the customer/user, who in turn is required to keep up to date with the new methods and components that can be used. The invention solves this problem too.

In this connection, it is important that the instruments and the components required by the user or customer can reach him or her without a sterile barrier having to be broken. In addition, the packaging must be such that sterilization can be performed easily in connection with production and/or use. According to the present invention, an arrangement and a method are proposed which allow different sizes of autoclaves to be used. The outer shape of the unit in question is chosen in such a way that it can be placed in the three different standardized autoclaves available today, namely European, Japanese and North American. It is therefore necessary, in steam sterilization, for the steam to gain easy access to the instruments and components in question and to ensure that condensate does not remain near the instruments and components. The invention solves this set of problems too.

In connection with implantation work, the surface available on which to arrange the components is often more or less limited. The instruments and the components must be made available in proximity to the patient and they must be easily accessible to the

surgeon. In this connection, it is necessary to be able to vary the surface available on which to arrange the instruments and the components. In some cases, only a fairly small surface can be made available, while in other cases a somewhat greater surface can be provided. The invention also deals with this problem and proposes an arrangement in which it is possible to adapt the surface for the instruments and components to the available space, i.e. the surface on which to arrange the instruments and components must be made variable according to the invention. In some cases, the surface on which to arrange the instruments and components can be doubled.

According to the invention, a module system is to be used in which modules which support instruments and components are to be fitted in a closable unit which comprises upper and lower parts. The modules must be able to be placed in the lower part in positions which are, on the one hand, freely selectable and, on the other hand, distinct. The modules must in addition be able to be displaced in two main directions in the horizontal plane so that they can be applied in the desired positions. The invention solves this problem too and proposes an arrangement and a method which permit the said displacement in a distinct and unambiguous manner, so that the modules in question take up distinct and predetermined positions in the lower part in question. When the upper and lower parts are joined together, the modules must be able to be maintained in their set positions, while at the same time the instruments and components applied on the modules are maintained in their positions on the modules. The invention solves this problem too.

In this connection, a generally known problem is that each operator has his or her own requirements regarding the organization (layout) and set-up of the instruments and components for the implantation work. Divergences in these requirements are also due to the fact that different surgeons will have different

specialities and fields of expertise. Some surgeons are specialized and frequent users of certain types of instruments and components, which requires a type of selection and layout which often must be able to be supplemented with the surgeon's own equipment and special instruments and components. Other surgeons or users perform only occasional operations and fittings, and this requires other, more general requirements for provision. The invention solves this problem too.

In connection with the handling of the instruments and the components, a modular system according to the invention must be able to work with markings known per se for different operations and constructions of implants. The invention also solves this problem and, in this connection, arrangements known per se can be used. In addition, the content of each structural unit for modules and instruments and components must be able to be categorized and marked. The space in each base tray must be able to be utilized optimally, and in some cases it will also be possible to apply a silicone mat which dampens application of instruments, components, further accessories, etc., in connection with the implantation work. The invention solves this problem too.

There is therefore a requirement to be able to tailor the provision of instruments and components to frequent users and to occasional users. In addition, the instruments and components, or some of them, must be able to be stored from one occasion to the next. In addition, the instruments and components must be able to be produced and distributed in a manner which is not critical in respect of the instruments and components. For example, the selection and packaging must be able to take place at a first location, and use and re-organization of the instruments and components at a second location. The said re-organization can also include the instruments and components provided at the outset being supplemented or partly replaced. Alternatively, the user must be able to add his own

modules and/or instruments and components. Further modules with associated instruments and components must be able to be added from a third location to the second location, and so on. The invention aims to solve this set of problems too.

SOLUTION

The feature which can principally be regarded as characterizing a method according to the invention is that, in a provision phase, the instruments and components which are necessary or can be used for the given implantation are applied on a number of first units which function as modules, and that the first units are arranged in a second unit which, after the application, is joined together with a third unit for enclosure of the first units, with a simultaneous position-determining function for the first units and the instruments and components arranged on these. In some cases, for example in connection with the abovementioned frequent users, the provision phase can be followed, if appropriate, by an organizational phase in which the second and third units are first separated and measures are then taken in accordance with one or a combination of the following alternatives. Thus, the first units serving as modules must be able to be moved in the second unit in accordance with the user's requirements. As a supplement or alternative to this, one or more first units in the second unit can be supplemented or replaced by further other first units, for example with a unit special to the user. Likewise, the instruments and components applied on each first unit must be able to be changed round, supplemented and/or replaced.

In a further development of the inventive concept, the provision phase is carried out or supplemented by means of one or more first units which are provided with instruments and components, serve as modules and are each joined together with a fourth unit

(a cover) which, in the applied position, maintains the instruments and/or components applied on the first unit in their applied positions on the first unit. In a further illustrative embodiment, the second and third units thus combined, and containing the first units and the instruments and components applied on these, are sterilized. Likewise, each first unit which is provided with the cover-shaped fourth unit can be sterilized together with the latter, together with the instruments and/or components applied and maintained on the first unit.

In a preferred embodiment, the first units are designed substantially square and/or rectangular in their horizontal sections. The positions of the first units in the second unit are determined by lengthways or sideways displacement in two directions perpendicular to each other in the horizontal section of the second unit, by whole or half multiples of the lengths or widths of the first units in the horizontal section of the second unit. The various distinct positions of the respective first unit are obtained by means of position-determining members on the first and second units.

An arrangement for providing instruments and components according to the invention can principally be regarded as being characterized by the fact that a number of first units designed as modules are designed to support the instruments and/or components which are necessary or can be used for the respective implantation. The arrangement is further characterized by the fact that a second unit is arranged to receive a number of first modules in mutually different, optional and distinct positions, between which the first units can be moved around even after application in the second unit. The second unit can cooperate with a third unit in a position of cooperation in which the second and third units enclose the first units and in so doing maintain, on the one hand, the first units in their positions in the second unit, and, on the other hand,

the instruments and/or components in their applied positions on the respective first unit.

In one embodiment of the inventive concept, a first unit serving as module can cooperate with its own fourth unit which, in a position on the first unit, maintains the instruments and/or components applied on the first unit. In a preferred embodiment, at least the third and fourth units are made of transparent material (plastic material) to make it possible to identify the instruments and components applied on the respective first unit, and/or the type of first unit and any further accessories, for example dishes. The first units can have essentially a block shape and are substantially square or rectangular in their horizontal section. The first and second units are provided with mutually cooperating first position-determining members for obtaining the said distinct positions. In further embodiments, the first and third units are provided with mutually cooperating second position-determining members for mutual position determination between the first and third units and for maintaining the instruments and components applied on the first units in the position of cooperation by means of the third unit. In one embodiment, the position-determining members work with a slight play. Also in the said embodiment, at least the first position-determining members comprise preferably long and narrow slots or recesses extending in two main directions in the horizontal plane of the second unit, and parts arranged on each first unit can be moved via the slots into the respective distinct position, the design of which parts preferably corresponds substantially to the shapes of the slots. The second unit and/or the position-determining members are arranged to prevent the position-determining members in question from coming into contact with a base on which the second unit is arranged.

In a preferred embodiment, the first position-determining members are arranged to permit passage of

steam in connection with the sterilization function for the first, second and third units and for the first and fourth units, respectively. Drainage holes arranged at low levels are provided to prevent condensate from remaining on the instruments and components. The units in question are also arranged with cut-outs and holes which allow steam to be sucked inside the units when subjected to underpressure in an autoclave. The units are preferably arranged in such a way that when they are combined, they have dimensions which permit sterilization in existing autoclaves of standard designs. In one embodiment, the second unit is designed as a first tray with an upwardly projecting outer edge or outer edge parts, in or on which first tray the first units serving as modules can be applied in any chosen number and in any chosen predetermined lengthways and sideways displacement positions in the horizontal section of the second unit. In this embodiment, the third unit is designed as a cover with a downwardly projecting outer edge or outer edge parts via which the cover can cooperate with the outer edge or outer edge parts of the second unit. The third unit functions preferably as a second tray when turned upside down, and the first units, instruments, components and possible other accessories and machine instruments, for example dishes, can be given an extended area near the site for the implantation work by means of the fact that the first and second trays can be placed alongside each other. The position-determining members are arranged to permit inclination of the trays without the first units falling out. In one illustrative embodiment, angles of inclination relative to a horizontal base are chosen within the range of 45 - 60°. The first tray can also be given a space for a soft mat, for example a silicone mat, with upwardly projecting tabs which function as shock absorbers upon application of instruments, components, accessories, etc., during the implantation work.

In a preferred embodiment, the first units serving as modules are designed with different parts supporting the instruments and components, and the first units can be individualized for supporting
5 different types, numbers, sizes, designs, etc., of the instruments and components and/or different kits. In this connection, signal markings can also be provided in accordance with the above, with the aid of so-called indicator flags. The first units are preferably
10 arranged with square horizontal sections of about 43 x 43 mm or rectangular horizontal sections of about 43 x 86 mm. The various first units on the first and second trays can be moved about 43 mm in one of the said two main directions in the horizontal plane, in
15 order to reach the next position in question. Each first unit or module can have the shape of a parallelepiped or box without a bottom part. The first unit supports the instruments and components on its top side. Arranged at the lower parts of the first unit
20 there are position-determining elements which can cooperate with corresponding position-determining elements in the second unit. In one illustrative embodiment, the position-determining elements can be elongate. In a storage or transport position, the
25 instruments or components can assume first positions on the module or the first unit. In a use position, the instruments and/or components can assume other positions in which, for example, they have been lifted and pressed down into holes so that they extend
30 essentially in the vertical direction of the first unit. One or more first units can have the compartments which are cup-shaped in one direction, at the lower parts of which the said drainage holes for condensate are arranged. The first unit is also provided with
35 third position-determining elements which cooperate with fourth position-determining elements on the third or fourth unit. The third or fourth unit can be arranged with internal compartments obtained by intersecting rib-like parts forming a positioning

system similar to the one for the second unit. The said fourth position-determining elements are arranged at the intersections of the rib-like parts and/or connections to the outer edge or outer edge parts of the third or fourth unit. The said fourth position-determining elements, in a horizontal section through the third or fourth unit, have a wing-like design. The third position-determining elements on each first unit are, at the top side thereof, in the form of parts with recesses, which recesses essentially correspond to, slightly exceeding, the shape or shapes of the wings or wing parts concerned. In one embodiment, the second unit can be rectangular in its horizontal section and is provided with a lock or snap-locking member for the second and third units on its short sides. The fourth unit or the cover is arranged so that it can be snapped onto the first unit in question.

A modular arrangement according to the invention is characterized in that first modules are arranged to receive and support the instruments and components, in that a second module consists of upper and lower parts which can be joined together, in that, when the upper and lower parts are separated, the lower part is arranged to receive, in chosen, predetermined positions, a number of first modules with instruments and components applied on these, in that, when the upper and lower parts are joined together, they enclose first modules applied in the chosen positions, with the instruments and components applied on these, and they maintain, on the one hand, the first modules in the chosen positions, and, on the other hand, the instruments and components on the first modules, and in that, in the implantation work, at least the lower part functions as a base tray for the instruments and the components, with retained, or partially supplemented or replaced, dispositions of the first modules and the instruments and components applied on these.

In one embodiment, the upper part also functions as a base tray for the first modules, the

instruments and the components and any other accessories during the implantation work. A support and base surface of variable size is available by choosing either the lower part or the upper and lower parts
5 together.

A modular arrangement according to the invention can principally be regarded as being characterized in that modules are arranged to receive and support the instruments and components, in that
10 each module can cooperate with a part functioning as a cover, in that the module and its cover placed thereon enclose the instruments and components applied on the module and hold the instruments and the components on the module, and in that, in the implantation work, the
15 module, if appropriate together with one or more other modules, functions as a base tray for the instruments and components, with retained, or partially supplemented or replaced, dispositions of the instruments and components applied on the module.

A use according to the invention is principally characterized in that first modules are used to support the instruments and components which are necessary or can be used in the implantation work, and in that
20 second modules are used, on the one hand, to enclose a number of first modules in chosen, distinct positions, with the instruments and components located on the
25 first modules, and, on the other hand, to form base trays for the instruments and the components and possible further accessories during the implantation work, with individual positions for the first modules
30 and/or instruments and components.

ADVANTAGES

35 By means of what has been proposed above, new approaches are opened up in implantation technology in terms of individualized selection of instruments and components from a very extensive range. Suppliers and users are provided with an effective aid which affords

economic benefits and can reduce the costs, for example for the supplier, by up to 25 to 30%. The ergonomics of the new equipment make it easier for individuals and personnel to handle and to use the equipment. The invention permits considerable variations in the individualization, layout and organizational functions, permitting attractive new concepts. Drill holes can be made and organized in chronological order. Grouping into different platforms is possible, as is colour marking for each platform. Each module can comprise information for direction indicators during work. The instruments and components can be stored upright or lying on their sides, and each module or some of the modules can comprise inclined bores for storage of long instruments and components. In addition, it is possible to arrange a module as wash-stand part. The module can support instruments for milling, machine punches and other larger machine instruments, for example manual torque extractors, extended drill shafts, etc. In addition, the module/modules can support guide pins, screw taps, spacers, hexagonal wrenches, gold screws, aesthetic cones, tweezers, etc. The module system permits use of predetermined layouts and re-organized layouts. The combined upper and lower parts (cf. second and third units according to the above) are adapted to the Japanese autoclave system in respect of width, to ISO autoclaves in respect of length, and to Canadian STATIM autoclaves in respect of height. The upper and lower parts can be made of plastic. The actual modules can be treated separately and loaded and packaged and presented thus in storage, distribution, use, etc.

DESCRIPTION OF THE FIGURES

A method, an arrangement and a use according to the invention will be described below with reference to the attached drawings, in which:

Figure 1 shows a first embodiment of a module or first unit, in perspective, obliquely from above, and from the left,

Figure 2 shows a second embodiment of the module or the first unit, in perspective, obliquely from above, and from the left,

Figure 3 shows a cover which can be applied on the modules according to Figures 1 and 2, in perspective, obliquely from below, and from the right,

Figure 4 shows a tray-shaped enclosure unit for modules according to Figures 1 and 2, in perspective, obliquely from above, and from the right,

Figure 5 shows, from below, a cover and an upper part intended to be applied on the unit according to Figure 4, with modules according to Figures 1 and 2 lying in it,

Figure 6 shows, in a horizontal view, a module in a third embodiment and intended to support components and to be placed in a unit according to Figure 4,

Figure 7 shows, in a horizontal view, the unit according to Figure 4 with modules placed in it, with associated components and instruments,

Figure 8 shows, in a horizontal view, a re-organization, addition, replacement of instruments and components, modules, etc., in relation to Figure 7,

Figure 9 shows, in block diagram form, a possible distribution and packaging procedure using modules according to Figures 1 and 2 and units according to Figures 4, 7 and 8,

Figure 10 shows, in a horizontal view, how the modules in the unit according to Figure 4 can be moved to various distinct positions within the unit, and

Figures 11 and 12 show different details in vertical section and side view, respectively.

DETAILED EMBODIMENT

In Figure 1, a module is indicated by 1. The module has a support surface 1a in its upper parts.

Various sets of components for dental use and/or for implantation in the human body can be applied on the support surface. In accordance with what is described below, the module is intended to be able to function
5 either separately or together with other modules. The module can be packed/loaded, distributed and used separately or placed in enclosure units according to what is described below. In the present case, the module is designed with a rectangular horizontal
10 section and also has the form of a parallelepiped or box. In one embodiment, the module has no bottom part and is made of suitable plastic material. The module has relatively thin material at its side parts. Arranged at the lower parts of the module there are
15 bearing members or position-determining members 1b, 1b', 1b'', by means of which the module can be placed in distinct positions in a unit in accordance with what is described below. The said position-determining members 1b, 1b' and 1b'' are uniformly distributed
20 along the periphery or side surfaces of the module. At its upper parts, the module is provided with further position-determining members 1c, 1c' and 1c'' which can cooperate with corresponding position-determining members on units, in accordance with what is described
25 below. The position-determining members 1c, 1c' and 1c'' consist in principle of elongate cut-outs or depressions. The first-mentioned position-determining members 1b, 1b' and 1b'' have elongate shapes.

Figure 2 shows an embodiment of a module 1',
30 different from the embodiment according to Figure 1, and provided with a support surface 1a'. The module surface 1a' can support the components lying on their sides or upright and for this purpose has holes 1a'' which can in principle be arranged vertically or
35 inclined (drilled obliquely), in which latter case it is possible to apply components or the like of a certain (relatively long) length on the module. The module surface 1a' can also be provided with various types of depressions 1a'''. Markings can also be

provided on the top surface in order to indicate a certain course in an operating procedure, compare 1a'''' in Figure 1.

Figure 4 shows a lower part or lower unit 2 which is intended to be able to store a number of modules according to Figures 1 and 2, together with further accessories mentioned below. The unit is provided with a bottom part 2a and an upwardly projecting outer edge 2b or outer edge parts. The bottom part 2a is provided with position-determining members 2a' which, in the case illustrated, consist of elongate or long and narrow cut-outs. By means of these cut-outs, the lower part stores each module by cooperation between the position-determining members 1b, 1b', 1b'' of the module and the position-determining members 2a'. The said cut-outs and position-determining members can of course be given other forms. Each module bears in the cut-outs 2a' with a certain play so that the cut-outs 2a can serve not only as position-determining members but also as passage holes for steam in connection with steam sterilization in an autoclave or autoclaves. The lower part 2 is intended to function as a tray/support tray for instruments and components and any other accessories. A lower part which is provided with a number of modules and other accessories according to what is described below can function as a support tray.

In Figure 5, reference number 3 indicates an upper part or cover which can be applied on the lower part according to Figure 4. The upper part or cover comprises an internal compartment system which has been formed using rib-like parts 3a, 3b which intersect each other at right angles, the rib parts 3a being essentially parallel to the longer side edges 3c of the cover 3, and the rib-like parts 3b being essentially parallel to the shorter side edges 3d of the upper part. The top surface of the upper part is indicated by 3e and the said side edges thus extend down from this top part. At the intersections of the rib-like parts

and at the connections to the edges, the top part is provided with position-determining members 3f and 3g which can cooperate with the position-determining members 1c, 1c', 1c'' (Figure 1) of each module 1, 1'.

5 The upper and lower parts 3 and 2, respectively, are provided with locking members 3h and 2c by means of which the upper part 3 can be locked to the lower part 2b. Side surfaces 3c and 3d come into cooperation with the peripheral edge 2b or peripheral edge parts. The
10 upper part 3 is made of transparent plastic material of a type known per se and is further provided with an arrangement 3i for identification tags and with holes 3k for steam to pass through in connection with the said sterilization function.

15 The upper and lower parts according to Figures 4 and 5 are arranged in such a way that the parts can positionally fix the modules in question in their various positions and can at the same time fix or maintain the components applied on the modules and the
20 other instruments and accessories placed in the lower part. The transparency of at least the upper part allows the user or the person handling the system to see what has been placed in the package. In the illustrative embodiment shown, the lower part 2
25 according to Figure 4 is made of a stain-resistant material, although it can also be made of plastic material, which can be transparent. The upper part according to Figure 5 can also function as a base tray and is in this case turned upside down so that the top
30 surface cooperates with a base. The compartments 3l formed by the rib-like parts 3a, 3b can then function as fastenings together with the position-determining members 3f and 3g when the module is moved over from the lower part to the upper part. The compartments can
35 also constitute fixing spaces for the dishes of titanium or equivalent material which are described below. The upper and lower parts can be provided with small holes for passage of steam in connection with sterilization.

The module according to Figures 1 and 2 can function independently as a support tray for components and instruments or can function together with other separate modules in order to form a common support surface. The modules can then be placed alongside or at a distance from each other. The modules with associated components and possible instruments can be packed or loaded and distributed separately. In this case, the module cooperates with a cover 4 according to Figure 3. This cover too is provided with position-determining members 4a and 4b which cooperate with the position-determining members 1c, 1c' and 1c'' of the module. In addition, the cover comprises guide members 4c which cooperate with side surfaces on the parts having the guide members 1b, 1b', i.e. the guide member 4c can be engaged in the space 1b''' (see Figure 1) between the said guide members 1b, 1b' on the module. Like the cover 3 according to Figure 5, the cover 4 is arranged to maintain the components and instruments applied on the surface 1a of the module.

By means of the arrangement according to Figures 1 to 5, support surfaces for instruments and components can be varied within wide limits by using the lower part 2, the upper part 3 and the surfaces 1a, 1a' of various modules.

Figure 6 shows, in a partially exploded view, how a module 1'' can be provided with different components. As regards the structure and configurations of the components, reference is made in purely general terms to the Bränemark System® and to the list given above. In the figure, the components are indicated by their article numbers in the said system and will therefore not be described in any detail here. As is shown in Figure 6, the module can be added to the lower part 2' in any desired distinct position, which in the present case is a position in the upper right-hand corner of the lower part. The area or surface which is not occupied by the module in the lower part can be provided with a silicone mat or a base of similar type.

The mat has been indicated by 5 in Figure 6. The mat is preferably designed with tabs which extend in the vertical direction of the lower part and dampen the application of tools 6, dishes 7 and other accessories.

5 Figures 7 and 8 show two different layouts of the support trays or the lower parts 2'' and 2'''. In this case too, the various components and instruments will not be described in detail, but it will be evident to the person skilled in the art which components and
10 instruments can be applied in the unit and it will be clear that their various positions can be varied within wide limits. The mat 5', 5'' can be cut out from metre material. Figures 7 and 8 show the possibility of re-organization where, for example, a user can obtain
15 the equipment according to Figure 8 and re-organize it to his own requirements to get the equipment according to Figure 7, or vice versa.

 In Figure 9, an extensive range of instruments and components and accessories is indicated by 8, in
20 which respect reference may be made to the said system. Instruments, components and/or accessories are selected from the range and transferred according to the arrows 9 to a module or lower part 10. A given module may support only instruments or components or accessories.
25 The module(s) is (are) loaded with the selected instruments, components, etc. The module or the unit formed by the upper and lower parts according to Figures 4 and 5 can be sterilized in autoclave 11, the transfer function having been indicated by 12. The
30 module or unit can be loaded and packed at a first location 13 and distributed from there, see arrow 14, to a second location 15. In accordance with what has been described above, the instruments and/or components and/or accessories can be re-organized, added to or to
35 some extent replaced in accordance with the arrows 16, 17, 18 and 19. Sterilization can take place alternatively or additionally in autoclave 20. The module 21, accessories etc. can be brought from a third location in accordance with arrow 23.

Figure 10 shows the displaceability of the modules in the lower part according to Figure 4. The modules can have a rectangular horizontal section 1''' or square horizontal section 1'''. With the position-determining members described above, the modules can be moved to distinct positions adjacent to or at a distance from each other. Thus, the module 1''' can be moved half a module in its longitudinal direction. The new position is indicated by I. The module can also be moved sideways to position II. The module can also be moved sideways and twisted round to position III, and so on. The directions of movement have been indicated by 24, 25 and 26, respectively. The module 1'''' can be moved to positions IV and V, the directions of movement being indicated by 27 and 28, respectively. The module 1''''' which has a rectangular horizontal section can, for example, be moved a whole length distance to position VI. The direction of movement is in this case indicated by 29. Each new position constitutes a distinct and optional position and, when the module in question has been placed in its selected position, it is fixed by means of the position-determining members described above. The modules 1''', 1'''' and 1''''' can be moved by half or whole multiples of their horizontal section.

Figure 11 shows that the lower part 2'''' can be provided with a foot-like arrangement 30 arranged to prevent the position-determining member 1b'''' on a module from not striking against a base surface 31. Figure 12 shows an indicator flag known per se which is used in connection with the module system for coding the component range. The system can thus be considered as comprising first modules 1, 1' and second modules 2, 3 which together enclose the first modules. Alternatively, the cover 3 can be seen as a module for the modules 1, 1'. Two main directions for the movements of the modules in the lower part are indicated by 33 and 34 in Figure 10, which main directions are at right angles to each other. The cover

4 is arranged so that it can be snapped onto the respective module 1, 1'.

5 The invention is not limited to the embodiment disclosed above by way of example, but can be modified within the scope of the attached patent claims and the inventive concept.

PATENT CLAIMS

1. Method for use in connection with implantation
5 in bone, for example in jawbone, permitting one or more
choices of instruments and components for one or more
implantations from an extensive range of instruments
and components, for example fixtures, thread taps,
10 screws, etc., and also permitting individualized
organization (set-up) of the respective chosen
instruments and components for the person performing
the respective implantation, characterized in that, in
a provision phase, the instruments and components which
15 are necessary or can be used for the given implantation
are applied on a number of first units which function
as modules (1), and in that the first units are
arranged in a second unit (2) which, after the
application, is joined together with a third unit (3)
20 for enclosure of the first units, with a simultaneous
position-determining function for the first units and
the instruments and components arranged on these, and
in that, in an organizational phase which may follow
the provision phase, the second (2) and third (3) units
25 are first separated and measures are then taken in
accordance with one or a combination of the following
alternatives:

- a) the first units serving as modules are moved
round in the second unit,
- b) one or more first units (1) are supplemented
30 or replaced by further first units, and
- c) the instruments and components applied on
each first unit (1) are changed round, supplemented
and/or replaced.

2. Method according to Patent Claim 1,
35 characterized in that the provision phase is carried
out or supplemented by means of one or more first units
(1) which are provided with instruments and components,
serve as modules and are each joined together with a
fourth unit (4) which, in the applied position,

maintains the instruments and components applied on the first unit in their application positions on the first unit.

3. Method according to either of the preceding
5 claims, characterized in that the combined second and third units (2, 3), containing the first units (1) serving as modules and the instruments and components applied on these, and further accessories, for example dishes, which may be contained in the second and third
10 units, are all sterilized together.

4. Method according to Patent Claim 1, 2 or 3, characterized in that each first unit (1) serving as module and provided with a fourth unit, and the instruments and components applied on the first unit
15 (1) and maintained in place by the fourth unit (4), are all sterilized together.

5. Method according to any of the preceding patent claims, characterized in that the first units serving as modules are given substantially square (1''')
20 and/or rectangular (1''') designs in their horizontal sections, and in that their positions (I-VI) in the second unit are determined by lengthways or sideways displacement in two directions (33, 34) perpendicular to each other in the horizontal section of the second
25 unit, by whole or half multiples of their lengths or widths in the horizontal section of the second unit, and in that, in each distinct position of the respective first unit, mutually cooperating position-determining members on the first and second units are
30 activated.

6. Method according to any of the preceding patent claims, characterized in that the provision phase is effected at a first location (13), from which the combined second and third units (2, 3) containing
35 first units serving as modules, and instruments and components applied thereon, are distributed, and in that the organizational phase is effected at a second location (15), for example near the site of the implantation work, optionally with supplementary or

replacement first units or accessories from a third location (22).

7. Arrangement for providing instruments and components, for example fixtures, thread taps, screws, etc., for implantation work in bone, for example jawbone, and for making it possible to individualize this provision to the person performing the work, characterized in that a number of first units (1) designed as modules are arranged to support the instruments and components which are necessary or can be used for the respective implantation, in that a second unit is arranged to receive a number of first modules (1) in mutually different, optional and distinct positions, between which the first units can be moved around even after application, in that the second unit (2) can cooperate with a third unit (3) in a position of cooperation in which the second and third units enclose the first units and in so doing maintain, on the one hand, the first units in their positions in the second unit, and, on the other hand, the instruments and components in their applied positions on the respective first unit (1).

8. Arrangement according to Patent Claim 7, characterized in that a first unit (1) serving as module can cooperate with its own fourth unit (4) which, in a position on the first unit, maintains the instruments and components applied on the first unit.

9. Arrangement according to Patent Claim 7 or 8, characterized in that at least the third and fourth units (2, 3) are made of transparent material to make it possible to identify the instruments and components applied on the respective first unit, and/or the type of first unit and any further accessories, for example dishes.

10. Arrangement according to Patent Claim 7, 8 or 9, characterized in that the first units (1) have essentially a block shape and are substantially square (1''') or rectangular (1'') in their horizontal section.

11. Arrangement according to any of Patent Claims 7 to 10, characterized in that the first and second units (1, 2) are provided with mutually cooperating first position-determining members (1b', 2a') for obtaining the said distinct positions.
12. Arrangement according to any of Patent Claims 7 to 11, characterized in that the first and third units (1, 3) are provided with mutually cooperating second position-determining members (1c, 4a) for mutual position determination between the first and third units (1, 3) and for maintaining the instruments and components applied on the first units in the position of cooperation by means of the third unit.
13. Arrangement according to either of Patent Claims 11 and 12, characterized in that the position-determining members (1b, 2a') work with a slight play.
14. Arrangement according to any of Patent Claims 11, 12 and 13, characterized in that at least the first position-determining members (2a') comprise preferably long and narrow slots or recesses extending in two main directions (33, 34) in the horizontal plane of the second unit, and parts (1b) arranged on each first unit (1) can be moved via the slots into the respective distinct position, the design of which parts (1b) preferably corresponds substantially to the shapes of the slots, and in which case the second unit and/or the position-determining members are arranged to prevent the position-determining members in question from coming into contact with a base (31) on which the second unit (2) is arranged.
15. Arrangement according to any of Patent Claims 11 to 14, characterized in that at least the first position-determining members (2a') are arranged to permit passage of steam in connection with the sterilization function for the first, second and third units (1, 2, 3) and for the first and fourth units (1, 4), respectively.
16. Arrangement according to any of Patent Claims 7 to 15, characterized in that the first and second units

(1, 2) are arranged with drainage holes arranged at low levels for any condensate which develops in connection with steam sterilization, in order to prevent condensate remaining inside the combined units.

5 17. Arrangement according to any of Patent Claims 7 to 16, characterized in that the units are arranged with cut-outs and holes which allow steam to be sucked inside the units when subjected to underpressure in an autoclave (11, 20).

10 18. Arrangement according to any of Patent Claims 7 to 17, characterized in that the units are arranged in such a way that when they are combined, they have dimensions which permit steam sterilization in currently available autoclaves (11, 20) of standard
15 designs.

19. Arrangement according to any of Patent Claims 7 to 18, characterized in that the second unit (2) is designed as a first tray with an upwardly projecting outer edge (2b) or outer edge parts, in or on which
20 first tray the first units serving as modules can be applied in any chosen number and in any chosen predetermined lengthways and sideways displacement positions (I-VI) in the horizontal section of the second unit.

25 20. Arrangement according to any of Patent Claims 7 to 19, characterized in that the third unit (3) is designed as a cover with a downwardly projecting outer edge (3c, 3d) or outer edge parts via which the cover can cooperate with the outer edge (2b) or outer edge
30 parts of the second unit (2).

21. Arrangement according to Patent Claim 20, characterized in that the third unit (3) is arranged to function as a second tray when turned upside down, and the first units, instruments, components and possible
35 further accessories and machine instruments, for example dishes, can be given an extended area near the site for the implantation work (13) by means of the fact that the first and second trays can be placed alongside each other.

22. Arrangement according to Patent Claim 19, 20 or 21, characterized in that the position-determining members are arranged to maintain the first units on the trays, even when these are inclined relative to a horizontal base at angles of up to 45 - 60°.

23. Arrangement according to any of Patent Claims 19 to 22, characterized in that part or parts of the available spaces in the first and second trays are divided off for a soft mat (5), for example a silicone mat, with upwardly projecting tabs which function as shock absorbers upon application of instruments, components, accessories, etc., during implantation work.

24. Arrangement according to any of Patent Claims 19 to 23, characterized in that the units (1) serving as modules are designed with different parts supporting the instruments and components, and in that first units can be individualized for supporting different types, numbers, sizes, designs, etc., of the instruments and components and/or different kits.

25. Arrangement according to any of Patent Claims 7 to 24, characterized in that the first units (1) are assigned various markings, preferably colour markings, for simple identification, on the first units, of instruments and components for wide platform (WP), narrow platform (NP) and normal platform in connection with tooth implantation work, which markings can consist of or comprise indicator flags (32).

26. Arrangement according to any of Patent Claims 7 to 25, characterized in that the first units are arranged with square (1''') horizontal sections of about 43 x 43 mm or rectangular (1''') horizontal sections of about 43 x 86 mm, and in that the various positions for the first units on the first and second trays are located at a distance of about 43 mm from each other by means of displacement in one of the said two main directions in the horizontal plane.

27. Arrangement according to any of Patent Claims 7 to 26, characterized in that each first unit (1) has

the shape of a parallelepiped or box without a bottom part, whose top side is arranged to support instruments and components and at whose lower parts there are first position-determining elements which can cooperate with
5 second position-determining elements in the second unit, which position-determining elements are elongate, for example.

28. Arrangement according to Patent Claim 27, characterized in that, in a storage and transport
10 position, the instruments and components assume first positions, for example lying on their sides, on each first unit, and, in a use position, they assume second positions in which, for example, they have been lifted and pressed down into holes so that they extend
15 essentially in the vertical direction of the first unit.

29. Arrangement according to any of Patent Claims 7 to 28, characterized in that one or more first units (1) have at least in one direction cup-shaped
20 compartments, at the lower parts of which the said drainage holes are arranged.

30. Arrangement according to any of Patent Claims 7 to 29, characterized in that each first unit (1) is provided with third position-determining elements which
25 cooperate with fourth position-determining elements on the third (3) or fourth (4) unit.

31. Arrangement according to any of Patent Claims 7 to 30, characterized in that the third and fourth units (3, 4) are arranged with internal compartments obtained
30 by intersecting rib-like parts (3a, 3b) forming a positioning system similar to the one for the second unit.

32. Arrangement according to Patent Claim 30 or 31, characterized in that the said fourth position-determining elements are arranged at the intersections
35 of the rib-like parts (3a, 3b) and/or connections to the outer edge or outer edge parts of the third or fourth unit (3, 4).

33. Arrangement according to Patent Claim 30, 31, 32 or 33, characterized in that the fourth position-determining elements, in a horizontal section through the third or fourth unit, have a wing-like design which, at the intersections of the rib-like parts (3a, 3b), can additionally have a star-like shape, and in that the third position-determining elements on each first unit are, at the top side thereof, in the form of parts with recesses, which recesses essentially correspond to, slightly exceeding, the shape or shapes of the wings or wing parts concerned.

34. Arrangement according to any of Patent Claims 23 to 33, characterized in that the soft mat (5) is chosen with an extent in the horizontal plane in which one or more side edges press slightly against the first sides placed in the second unit.

35. Arrangement according to any of Patent Claims 7 to 34, characterized in that the third and fourth units are provided with an arrangement for receiving an identification, for example an identification tag, of the contents.

36. Arrangement according to any of Patent Claims 7 to 35, characterized in that the second unit (2) is rectangular in its horizontal section and is provided with a lock (2c) or snap-locking members for the second and third units on its short sides.

37. Arrangement according to any of Patent Claims 7 to 36, characterized in that the fourth unit is arranged so that it can be snapped onto the first unit in question.

38. Modular arrangement for providing prosthetic instruments and sets of components for implantation in bone, for example dentine, in an individually organizable manner, characterized in that first modules (1) are arranged to receive and support the instruments and components, in that a second module consists of upper and lower parts (2, 3) which can be joined together, in that, when the upper and lower parts are separated, the lower part (2) is arranged to receive,

in chosen, predetermined positions, a number of first modules (1) with instruments and components applied on these, in that, when the upper and lower parts are joined together, they enclose first modules (1) applied
5 in the chosen positions of the said positions, with the instruments and components applied on these, and they maintain, on the one hand, the first modules in the chosen positions, and, on the other hand, the instruments and components on the first modules, and in
10 that, in the implantation work, at least the lower part functions as a base tray for the instruments and the components, with retained, or partially supplemented or replaced, dispositions of the first modules and the instruments and components applied on these.

15 39. Modular arrangement according to Patent Claim 38, characterized in that, in the implantation work, the upper part (3) also functions as a base tray for the first modules (1), the instruments and the components and any other accessories, in which case a
20 support and base surface of variable size is available by choosing either the lower part or the upper and lower parts together.

40. Modular arrangement for providing prosthetic instruments and sets of components for implantation in
25 bone, for example dentine, in an individually organizable manner, characterized in that modules (1) are arranged to receive and support the instruments and components, in that each module can cooperate with a part functioning as a cover (4), in that the module (1)
30 and its cover (4) placed thereon enclose the instruments and components applied on the module and maintain the instruments and the components on the module, and in that, in the implantation work, the module, if appropriate together with one or more other
35 modules, functions as a base tray for the instruments and components, with retained, or partially supplemented or replaced, dispositions of the instruments and components applied on the module.

41. Use of a modular arrangement with first and second modules (1 and 2, 3, respectively) in implantation work in bone, preferably in dentine, characterized in that the first modules (1) are used to support the instruments and components which are necessary or can be used in the implantation work, and in that the second modules (2, 3) are used, on the one hand, to enclose a number of first modules in distinct positions, with the instruments and components located on the first modules, and, on the other hand, to form base trays for the instruments and the components and possible further accessories during the implantation work, with individual positions for the first modules and/or instruments and components.

Fig. 1

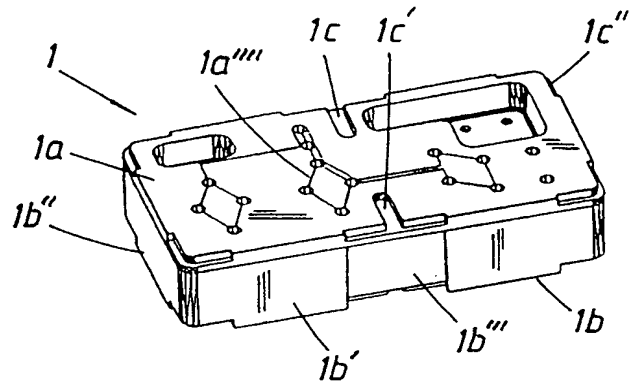


Fig. 2

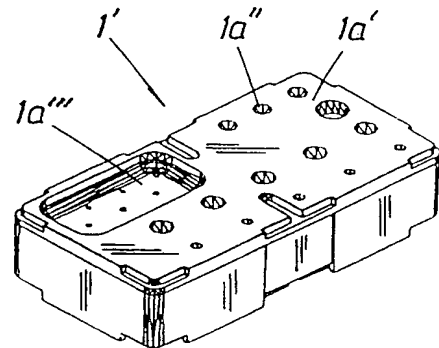


Fig. 3

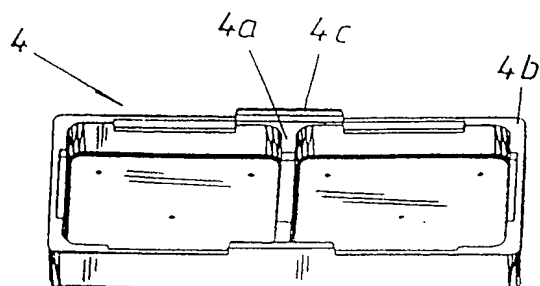


Fig. 4

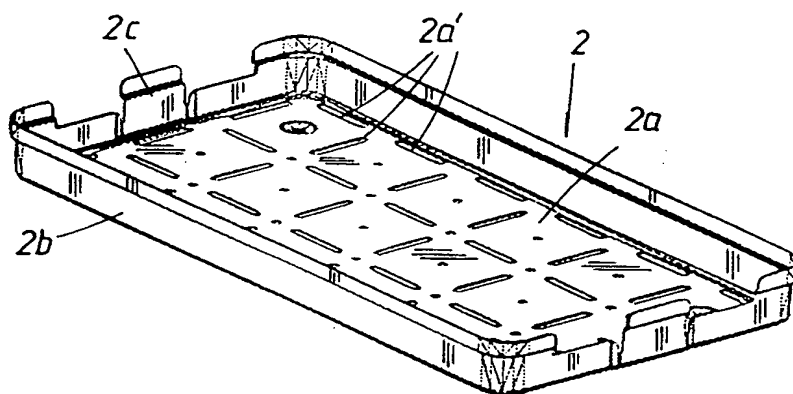


Fig. 5

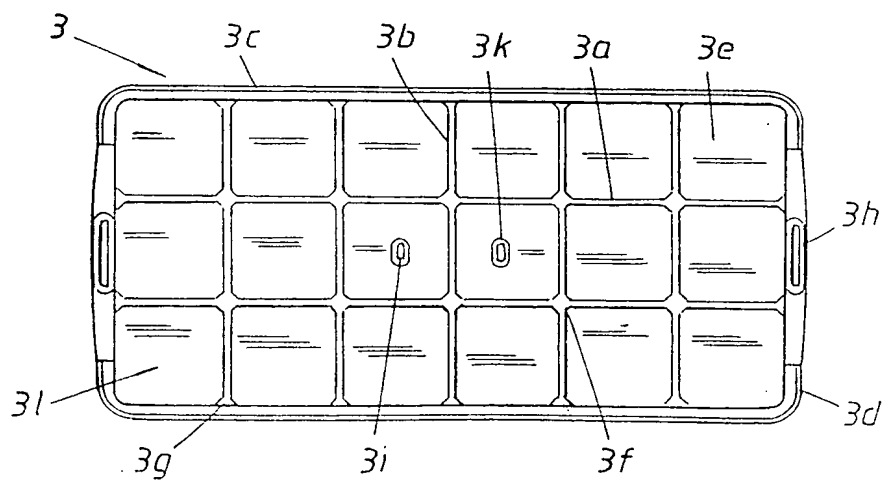


Fig. 6

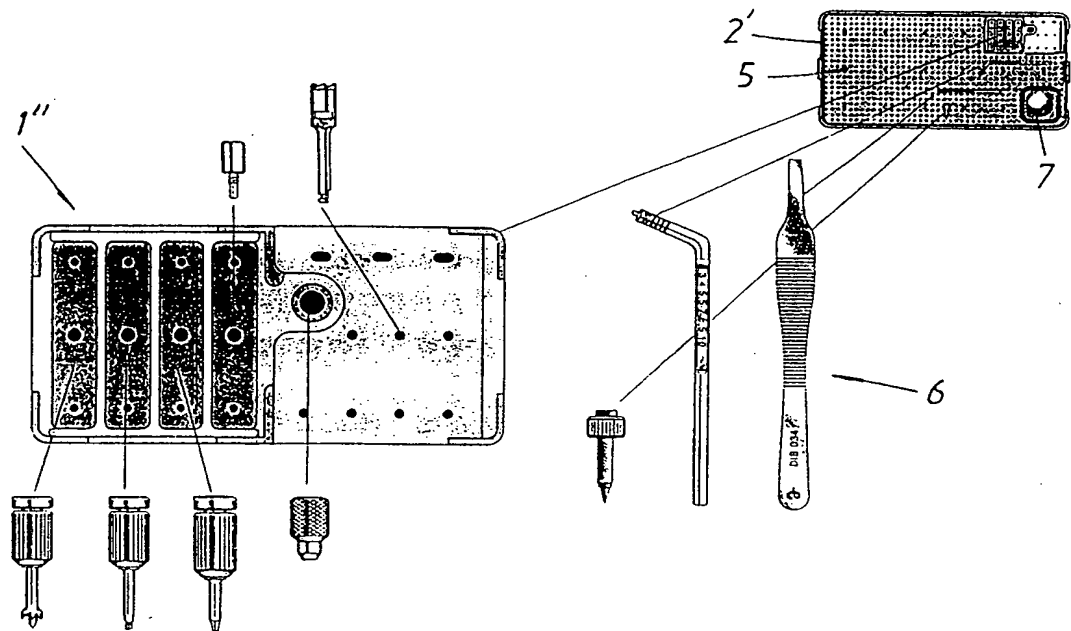
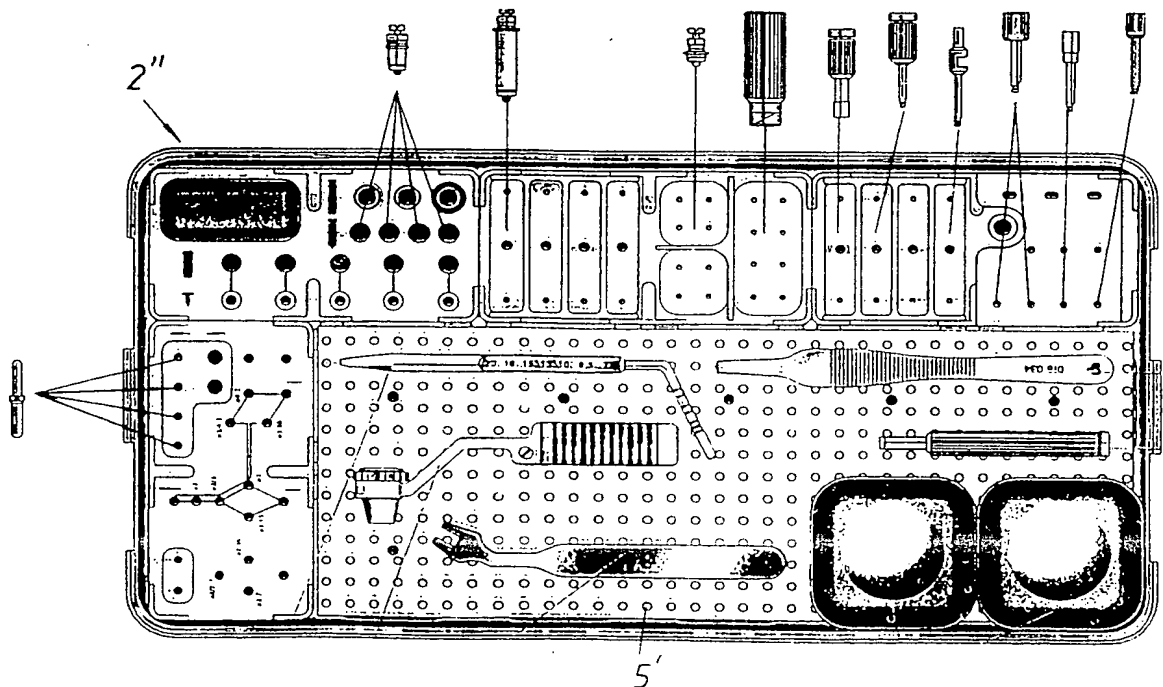
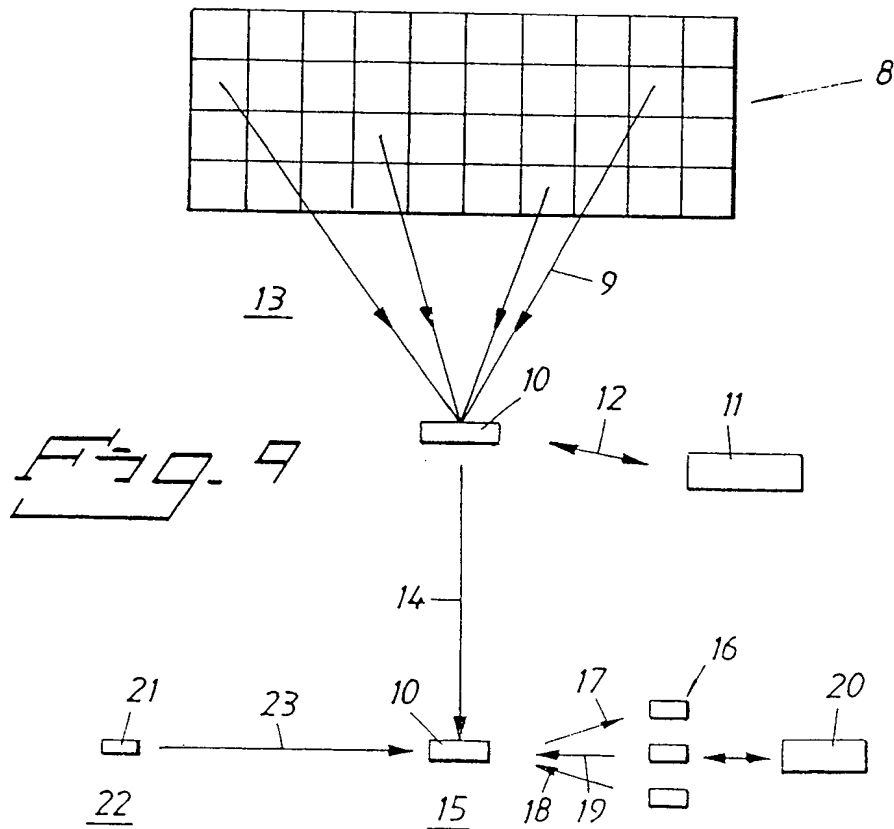
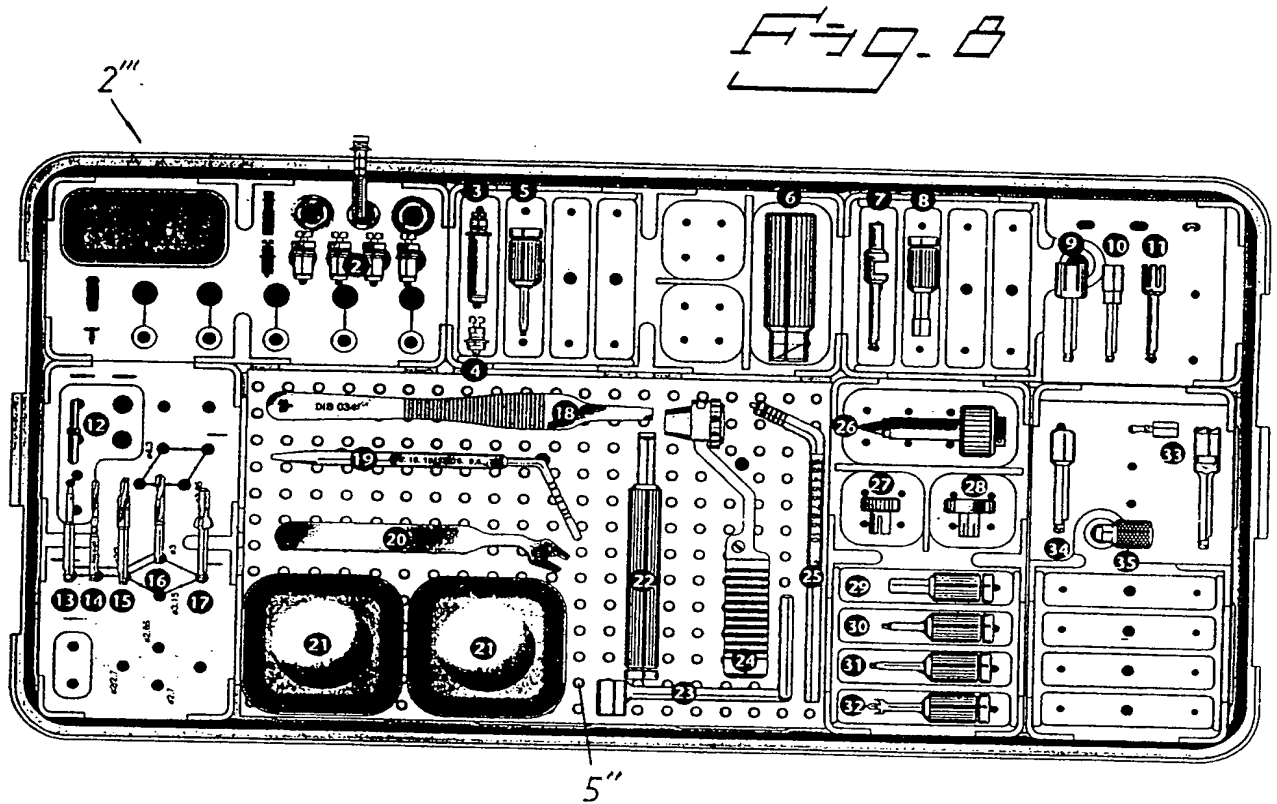


Fig. 7



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Fig. 10

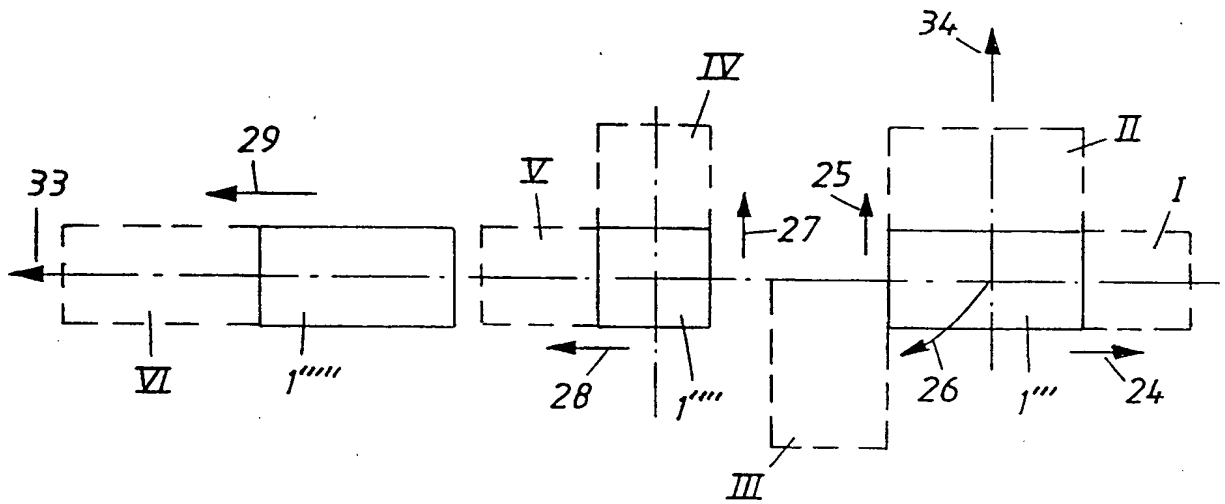


Fig. 11

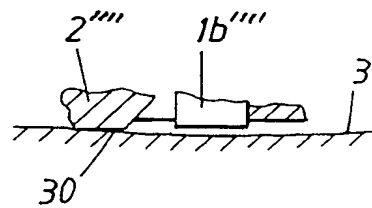
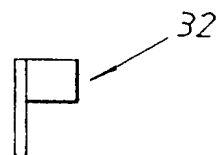


Fig. 12



INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/00352

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A61C 19/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A61C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9401055 A1 (ROUX, G. ET AL), 20 January 1994 (20.01.94)	1-41
	--	
A	WO 9508302 A1 (MINNESOTA MINING AND MANUFACTURING COMPANY), 30 March 1995 (30.03.95)	1-41
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☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

17 July 2000

Date of mailing of the international search report

19 -07- 2000

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INTERNATIONAL SEARCH REPORT

Information on patent family members

02/12/99

International application No.

PCT/SE 00/00352

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9401055 A1	20/01/94	AU 4505693 A FR 2693101 A,B	31/01/94 07/01/94
WO 9508302 A1	30/03/95	AU 7837794 A DE 9421694 U FR 2710249 A,B	10/04/95 20/06/96 31/03/95